CLAIMS

1. An article holder for holding articles that extend generally along a plane, the holder comprising:

a body, and a mechanism for holding an article extending generally along a plane in a position proximate to the body; and

one or more sensors for detecting whether an article proximate to the body is a workpiece or a piece of packaging material.

2. The article holder of Claim 1 wherein the one or more sensors include a color sensor for sensing a color of the article proximate to the body.

3. The article holder of Claim 1 wherein the one or more sensors include a capacitance sensor for sensing a capacitance of the article proximate to the body.

4. The article holder of Claim 1 wherein the one or more sensors include one or more sensors for sensing a thickness of the article held in the holder.

5. The article holder of Claim 1 further comprising an attachment portion for attachment to a robot;

wherein the body comprises a surface which is to face an article held by the holder;

wherein the one or more sensors comprise a sensor having a first part and a second part which is closer to the robot attachment portion than the first part, wherein the first part is positioned within a smaller distance from said surface of the body than the second part.

6. The article holder of Claim 1 wherein the body comprises one or more openings for emitting a gas flow or flows towards the article, the gas flow or flows drawing the article towards the body to hold the article proximate to the body, and the gas flow or flows creating a gas cushion between the article and the body.

7. The article holder of Claim 6 wherein each gas flow is a vortex.

8. The article holder of Claim 1 wherein each workpiece comprises a semiconductor wafer.

9. The article holder of Claim 1 wherein the article holder is controlled by a computer system.

10. An article handling method comprising:

picking up an article by an article holder having one or more sensors; and

having the one or more sensors generate one or more signals indicating whether the article is a workpiece or a piece of packaging material.

11. The article handling method of Claim 10 wherein the one or more signals include a signal indicative of a color of the article.

12. The article handling method of Claim 10 wherein the one or more signals include a signal indicative of a capacitance of the article.

13. The article handling method of Claim 10 wherein the one or more signals include a signal indicative of a thickness of the article.

14. The article handling method of Claim 10 wherein picking up the article comprises picking up the article from a container for storing workpieces and pieces of packaging material, each workpiece lying on a piece below.

15. The article handling method of Claim 10 wherein the one or more sensors indicate whether or not the article is broken.

16. The article handling method of Claim 10 wherein the one or more sensors indicate whether or not the article is a semiconductor wafer.

17. The article handling method of Claim 10 wherein the article is picked up with one or more gas flows emitted from the article holder towards the article.

18. The article handling method of Claim 17 wherein each gas flow is a vortex.

19. The article handling method of Claim 10 wherein the one or more signals are provided to a computer system which uses the one or more signals to determine if the article is broken.

20. A computer system programmed to receive the one or more signals from the article holder of Claim 1 and control a robot to perform actions responsive to the one or more signals.

21. The computer system of Claim 20 wherein the computer system comprises (1) a computer which is part of a robot, and/or (2) a programmable logic controller.

22. A computer readable medium comprising computer instructions for programming the computer system of Claim 20.

23. An end effector comprising:

a mechanism for holding an article; and

one or more sensors for detecting a type of the article held.

24. The end effector of Claim 23 wherein the one or more sensors include one or more sensors for detecting a semiconductor wafer.

25. The end effector of Claim 23 wherein the one or more sensors include a color sensor responsive to a color of the article.

26. The end effector of Claim 23 wherein the one or more sensors include a capacitance sensor.

27. The end effector of Claim 23 wherein the one or more sensors include one or more sensors responsive to a dimension of the article.

28. The end effector of Claim 23 wherein the dimension is a thickness of the article.

29. The end effector of Claim 23 wherein the mechanism for holding an article comprises one or more vortex chucks for emitting one or more vortices towards the article, the vortices holding the article in the end effector and generating a cushion between the article and the end effector.